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COTTON IN BRAZIL



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BRAZIL

COTTON PRODUCTION IN MAJOR PRODUCING STATES*

Each dot equals 25,000 bales or fraction thereof

- | | | |
|------------------------|----------------------|-----------------------|
| 1. Roraima | 10. Pernambuco | 19. Minas Gerais |
| 2. Amazonas | 11. Alagoas | 20. Espírito Santo |
| 3. Amapá | 12. Sergipe | 21. São Paulo |
| 4. Pará | 13. Acre | 22. Guanabara |
| 5. Maranhão | 14. Rondônia | 23. Rio de Janeiro |
| 6. Piauí | 15. Mato Grosso | 24. Paraná |
| 7. Ceará | 16. Goiás | 25. Santa Catarina |
| 8. Rio Grande do Norte | 17. Bahia | 26. Rio Grande do Sul |
| 9. Paraíba | 18. Distrito Federal | |



BASED ON TRADE ESTIMATES OF 1969-70 PRODUCTION.

FOREWORD

For many years, Brazil has been a major producer and exporter of cotton and a major U.S. competitor in most of the cotton import markets. In 1969-70, Brazil ranked third as an exporter—preceded only by the United States and the Soviet Union.

This study is another in the continuing series of reports on competitive agricultural developments in countries that are major export competitors of the United States. It is intended to help U.S. cotton interests evaluate prospective developments with respect to Brazilian cotton and their impact upon future exports of U.S. cotton.

We wish to express our appreciation to the various industry representatives, Government officials, and farmers in Brazil who supplied information on this and previous trips to Brazil. The author wishes to thank each person who contributed to the study, including the Agricultural Attaché and his staff in Brasília and Rio de Janeiro and the Agricultural Officer in São Paulo.

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COTTON IN BRAZIL

By Horace G. Porter
Cotton Division

SUMMARY AND CONCLUSIONS

Cotton in Brazil has had a long history with numerous ups and downs. There have been periods when an up or down trend has run for some years, while at other times marked changes in one year have been reversed the following year. Cotton acreage, for instance, fell from 5.0 million acres to 3.7 million between 1955-56 and 1957-58, a drop of about 25 percent. Acreage then expanded by more than 80 percent during the next 12 years to an all-time high of 6.8 million acres in 1969-70. A drop of 12 percent occurred in 1970-71, and as of late May 1971, there seems little likelihood of any major change in area for 1971-72.

Higher yields are in prospect in North Brazil for 1971-72, reflecting recovery from the drought year 1970-71. There also is the possibility of higher yields in South Brazil where yields were below average last year and this. Should this materialize, a significant increase would occur in Brazilian cotton production in 1971-72 from the depressed 1970-71 level of 2.2 million bales.

As a result of continued high domestic cotton consumption and a short crop, exports have been sharply reduced in 1970-71. The higher expected production in 1971-72 will permit some recovery in exports in that year but they are expected to continue much below the peak level of 1.9 million bales in 1969-70.

The 1969-70 crop was an especial disappointment to many farmers in South Brazil. Early season indications that year had been for a record crop from the record acreage. Yield prospects were encouraging until excessive rains occurred and insects got out of hand. Yields, instead of increasing substantially, dropped from the 1968-69 level of 375 pounds of lint per acre to 318. In the State of São Paulo, the drop was from 480 pounds to 382, and in Paraná, from 353 to 300. Cotton production costs had risen, and selling prices for seed cotton increased less than farmers deemed appropriate under the circumstances. The result was widespread disappointment with cotton even though farmers with good yields still made a profit.

In contrast, alternative crops did especially well. Profits from two traditional crops—corn and peanuts—and from a comparatively new crop—soybeans—were at or near record levels in 1969-70, and cotton farmers in South Brazil expanded acreage devoted to these crops in 1970-71 at the expense of cotton. In Northeast Brazil, acreage of cotton increased slightly in 1970-71, but severe drought cut production by more than half.

Even though farmers in South Brazil cut cotton acreage by about 21 percent in 1970-71, they expected to receive good prices for their crop. This expectation was, of course, influenced by the higher level of costs prevailing in the 1970-71 growing season, the short crop in the Northeast, and the level of market prices in São Paulo, which on the basis of Type 5 quotations increased from about 27 cents in October to nearly 31 cents in January 1971. However, by April, prices had declined to about 27 cents.

According to trade reports, the lint outturn is low this season. Ginners have offered considerably more than the support price of about 6.9 cents for seed cotton but have not offered as much more as farmers have insisted upon. Up to late May, most of the crop had been delivered to ginners, who appeared to be offering the equivalent of about 8.2 cents per pound of seed cotton or about 21.6 cents per pound of lint, after adjusting for the value of seed and ginning. Up to late May most farmers had declined to sell at offered prices and were reported to be holding for the equivalent of 8.9 cents per pound of seed cotton or 23.6 cents per pound of lint, after adjusting for the value of seed and ginning.

Farmers with high cotton yields appear to be making a good profit. Those of average efficiency and average yields also appear to be making a profit. However, after taking account of differences between cotton and competitive crops in capital requirements, the effort and risk of production, and the level of return, many farmers have elected to reduce cotton acreage and expand that of alternative crops. This was especially evident in both Paraná and São Paulo in 1970-71.

It is expected that Paraná farmers will continue to deemphasize cotton in 1971-72. In São Paulo, however, cotton acreage may be maintained, and further expansion of cotton appears to be in prospect in the other cotton-producing States of South Brazil.

THE RAW COTTON INDUSTRY

History

Cotton was being used in Brazil when the first Europeans reached the area in 1500, and to this day, wild cotton is still used by the Indians in the Amazon jungle. Early travelers and settlers indicated that the use of cotton was quite widespread in the areas they visited. The first cotton produced by the Portuguese settlers in Brazil was recorded in 1549, and exports probably began around that time. The first evidence of sizable exports is contained in a description of the cargo of a shipwreck off the coast of Brazil in 1565.

Production of cotton, all perennial (tree-type), expanded slowly, and cotton soon came to be used as money in several Northern states. In Maranhão, cotton exports were prohibited from 1703 to 1756 because cotton was considered money, and officials feared that if exports were permitted, the money supply would soon be exhausted. By 1775 cotton was an important item in Brazilian exports.

About this same time, the first sizable textile plants outside a crude but thriving home industry were established. Around 1800, following invention of the cotton gin and subsequent rapid expansion of cotton production in the United States, Brazilian production and exports leveled off, and the cotton industry remained fairly static until the U.S. Civil War. On a value basis, cotton represented 20 percent of Brazil's total exports during the decade of the 1820's. This percentage trended downward in the next few decades.

When in 1861 it became evident that cotton supplies from the United States would be curtailed because of internal strife, the thriving textile industry in Europe began to encourage South American farmers to produce more cotton. The British, especially, encouraged Brazilians to sharply expand their output, and shipped some seed from the United States to São Paulo for distribution. Although annual cotton had been introduced into Brazil some 20 years earlier in Minas Gerais, this was the first attempt to produce such cotton on a large scale in Brazil.

The São Paulo Government showed interest in the possibility of developing commercial cotton production. The owner of a large fazenda was guaranteed a profit for multiplying the annual-type seed distributed by the British. The following year, 1862-63, some 133 farmers received free about 7 pounds of seed for planting, and São Paulo cotton production was underway.

Volume and relative importance of cotton exports from Brazil, by decades

Decade	Average annual exports	Share of total exports	Decade	Average annual exports	Share of total exports
	<i>1,000 bales¹</i>	<i>Percent</i>		<i>1,000 bales¹</i>	<i>Percent</i>
1821-30	56	20.0	1901-10	89	2.1
1831-40	53	11.0	1911-20	70	2.0
1841-50	51	7.5	1921-30	105	2.4
1851-60	65	6.2	1931-40	715	14.3
1861-70	133	18.4	1941-50	903	11.3
1871-80	176	9.5	1951-60	560	6.2
1881-90	105	4.2	1961-69	996	6.6
1891-1900	73	2.5			

¹ Bales of 478 pounds net, 1821-30/1941-50; 480 pounds net, 1951-68/1961-69.

In 1862, São Paulo had a small volume—5 bales—of cotton for export. By 1865, exports totaled 12,000 bales and in 1871 reached a peak of 45,000. After this peak, a sharp decline began, and in 1877 exports totaled only 3,000 bales.

Cotton production in other Brazilian producing areas, stimulated by high prices, climbed rapidly between 1861 and 1871. Total Brazilian exports rose from 41,000 bales in 1860-61 to 196,000 in 1865-66 and to a peak of 361,000 in 1871-72, then began to decline in much the same pattern as had occurred in São Paulo.

Domestic consumption may also have been growing during this period. Available data reveal that cloth production in Brazil climbed from a level of at least 1.3 million yards in 1853 to 3.9 million in 1866 and 24.1 million in 1882.

Acreage and production¹

In terms of production, cotton is a leading crop in Brazil. However, it is grown on only a relatively small part of the nation's crop area (including perennial crops) of over 84 million acres. Corn, rice, coffee, and dry beans account for about 60 percent of that area, while cotton occupies about 12 percent. The foregoing notwithstanding, Brazil accounts for nearly three-fourths of the cotton acreage and nearly two-thirds of total production in South America.

Aggregate area devoted to all crops has continued to increase, with much of the expansion resulting from the settlement of new, previously uncleared land. For many years, Brazilians have pushed westward into the interior until at the present time the frontier is largely exhausted in São Paulo and Paraná. In South Brazil, cotton has played a prominent role in this westward movement, but increased cotton acreage farther to the West has at times been offset by declining cotton acreage in the older farming regions closer to the coast.

The big upward surge in cotton acreage started in 1933 and reached a peak of some 6.7 million acres² in 1940. This was more than three times the 1930-32 level. Following 1940, the acreage trended downward but with intermittent swings until the low point of 3.7 million acres was reached in 1957. Since that time, the trend has again been upward, and a new high of 6.8 million acres was established in 1969-70.

Brazilian cotton area, yield, and supply and distribution

Season ¹	Area	Yield of lint	Stocks, Aug. 1 ²	Production	Total supply	Consumption	Destroyed	Exports
	<i>Million acres</i>	<i>Pounds per acre</i>	<i>1,000 bales³</i>	<i>1,000 bales³</i>	<i>1,000 bales³</i>	<i>1,000 bales³</i>	<i>1,000 bales³</i>	<i>1,000 bales³</i>
1955	5.0	163	825	1,700	2,525	1,050	15	810
1956	4.3	145	650	1,300	1,950	1,040	5	380
1957	3.7	178	525	1,350	1,875	1,050	10	215
1958	4.0	168	600	1,400	2,000	1,150	8	242
1959	4.6	177	600	1,700	2,300	1,180	14	446
1960	5.0	187	660	1,950	2,610	1,250	5	695
1961	5.5	220	660	2,525	3,185	1,350	13	847
1962	5.5	201	975	2,300	3,275	1,250	5	1,145
1963	5.8	192	875	2,300	3,175	1,300	2	1,023
1964	5.8	175	850	2,100	2,950	1,150	0	1,040
1965	5.5	218	760	2,500	3,260	1,250	3	937
1966	5.0	197	1,070	2,050	3,120	1,250	—	1,014
1967	5.6	231	856	2,700	3,556	1,250	14	836
1968	6.5	244	1,456	3,300	4,756	1,325	—	1,765
1969	6.8	219	1,666	3,100	4,766	1,350	—	1,900
1970	6.0	176	1,533	2,200	3,778	1,375	45	1,300

¹ Beginning August 1.

² Includes cotton at mills and in trade channels.

³ 480 pounds net weight.

¹ A more detailed discussion of acreage, yield, and production is contained in the section on producing areas.

² Unless otherwise stated, data on aggregate cotton acreage used in this report are those used by the Foreign Agricultural Service of the U.S. Department of Agriculture, and they differ materially from those of the Brazilian Ministry of Agriculture.

It remains to be seen whether the cutback in 1970-71 is merely an interruption of the upward trend or the beginning of a new downward trend. Present indications are that a further decline will occur in Paraná in 1971-72, that little, if any, change will occur in São Paulo, and that other Southern states will increase cotton acreage in 1971-72.

Several decades ago, cotton production in Brazil responded closely to changes in acreage. Yields were rather similar in the Northeast and South. In the past two decades, yields have shown a tendency to strengthen, although the upward progress has been extremely irregular. Only in recent years have nationwide yields exceeded 200 pounds of lint per acre—far below the world average of over 300 pounds. Virtually all of the modest increase in Brazil's yield has been achieved in the South, where recent yields compare favorably with the world average.

Producing areas and competition from other crops

Brazil has two quite distinct areas of production—the South and the Northeast. In the South, cotton fits into a relatively intensive type of agriculture, and competition for land and other production resources is strong. In the Northeast there is the narrow Mata cotton zone paralleling the coast, where annual cotton is produced as a part of a commercial agriculture. This zone is characterized by higher and more dependable rainfall than the perennial cotton areas in the interior of the Northeast, which are too dry for dependable production of annual cotton. In the dryer areas cotton fits into a subsistence type of farming, and alternative cash crops are limited by the climatic conditions.

The accompanying table shows the relative position of cotton in the cropping system of major cotton-producing States of both South Brazil and the Northeast. In South Brazil, cotton is but one important crop in a highly diversified agriculture and ranks fifth in both acreage and value in the five major States taken as a group. In the Northeast, on the other hand, it ranks first in both acreage and value of production in the four major cotton States taken as a group. There are other States that produce some cotton, especially in the Northeast, but the cotton situation in the other States is believed to be similar to that in the States covered by this table.

Position of cotton in relation to other crops in major States of Brazil

Item	Area		Value of production	
	<i>1,000 acres</i>	<i>Percent</i>	<i>Million dollars</i>	<i>Percent</i>
Southern Brazil:¹				
Coffee	5,677	14.8	372.7	23.1
Rice	7,403	19.2	280.9	17.4
Corn	11,999	31.3	218.0	13.5
Sugarcane	1,996	5.2	140.2	8.7
Cotton	2,497	6.5	126.5	7.8
Beans	3,965	10.3	106.8	6.6
Cassavas	1,041	2.7	74.3	4.6
Peanuts	1,523	4.0	54.4	3.4
White potatoes	290	.8	49.7	3.1
Other	1,979	5.2	190.9	11.8
Total	38,370	100.0	1,614.4	100.0
Northern Brazil:²				
Cotton	6,059	41.1	92.3	23.6
Sugarcane	863	5.8	67.1	17.1
Cassavas	974	6.6	45.2	11.5
Beans	2,332	15.8	44.1	11.3
Corn	2,878	19.5	34.5	8.8
Bananas	164	1.1	34.0	8.7
Sisal	480	3.3	13.4	3.4
Other	1,003	6.8	61.1	15.6
Total	14,753	100.0	391.7	100.0

¹ São Paulo, Paraná, Minas Gerais, Mato Grosso and Goiás.

² Ceará, Rio Grande do Norte, Paraíba, and Pernambuco.

South.—The areas in which cotton is grown in South Brazil and noncotton areas further south represent the heart of Brazil's commercial agricultural resources, in terms both of present output and immediate potential. The States of São Paulo and Paraná account for about 20 and 18 percent, respectively, of the total value of Brazil's crop production. In addition to cotton, the southern States dominate in output of coffee, corn, rice, dry beans, sugarcane, peanuts, soybeans, potatoes, cattle, and hogs.

The South gained the lead in cotton production from the Northeast in the 1930's under impetus from some strengthening of yields and a sharp jump in area. This lead has been maintained; and in recent years, the South has accounted for nearly three-fourths of Brazil's cotton. The southern crop is grown on less than one-half of the nation's aggregate cotton area—a reflection of the higher yields that have been obtained in the South. Acreage has shown an upward trend in South Brazil in recent years, although there have been some marked year-to-year changes in both directions. Cotton production has moved westward in South Brazil over the past generation.

Acreage, yield, and production in 1970-71 for southern cotton-producing States follow; these data reflect estimates from various trade sources, rather than official statistics:

	Area <i>1,000 acres</i>	Yield <i>Lb./acre</i>	Production <i>1,000 bales¹</i>
São Paulo	1,267	389	1,027
Paraná	921	287	551
Minas Gerais	269	119	66
Mato Grosso	120	313	78
Goiás	120	276	69
Total South	2,697	319	1,791

¹480 lb. net.

Cotton acreage in São Paulo reached an average of 4.1 million acres in the early 1940's. Since that time it has declined and during the past five seasons has ranged between 0.7 million acres in 1966-67 and 1.5 million in 1969-70. Acreage in Paraná continued upward to a peak of nearly 1.5 million acres in 1968-69, from which it settled back to 1.4 million in 1969-70 and about 0.9 million this year.

Minas Gerais State, though far behind São Paulo, for many years ranked second among the southern States in cotton acreage. With this State's dropback during the 1940's, Paraná first drew abreast with it and later moved securely into second place among southern States. Minas Gerais' acreage trended upward to an apparent peak of nearly 500,000 acres in 1964. Since that time, it has dropped to levels ranging between about 257,000 and 272,000 acres. Currently, a program to greatly expand cotton production in the northern part of Minas Gerais is being undertaken by a Japanese trading company, the State Government of Minas Gerais, the Development Bank of the State, and cooperative organizations in Minas Gerais and São Paulo.

Cotton also is grown in Goiás. This State now has about 120,000 acres, or slightly less than in the early 1960's, but high yields are encouraging acreage expansion in parts of the state. Mato Grosso now has about the same acreage as in Goiás and acreage is continuing to expand.

Competition between various crops and other lines of farm production has been intense over the years in the southern cotton area for both developed agricultural land and new, uncleared land. Cotton competes for developed land with coffee and pasture in addition to such annual crops as corn, peanuts, soybeans, and rice. Land is often shifted to coffee or pasture from annual crops; the reverse movement seldom occurs on a permanent basis, except where coffee is abandoned as a result of soil depletion or freeze damage.

Contributing to the general downward trend in cotton acreage in São Paulo State—leader in cotton output—has been the fact that competitive crops are easily marketed in the rapidly growing urban areas of that State. São Paulo is the industrial center of Brazil, but there are a number of other rapidly growing urban areas. The expansion of the urban areas has been associated with a heavy off-farm movement of labor so that compared with former times cotton farmers now find farm labor relatively scarce and farm wage rates significantly higher, although by U.S. standards they would still be thought of as low. In addition to the excellent market for various other agricultural commodities, the sharply rising demand for food over the years has adversely affected cotton production.

Cotton prices, closely related to world price levels, have frequently not been as profitable to producers as have those for perishable food products and some staple food crops that can be readily marketed in urban areas.

Cotton acreage and production in selected areas of Brazil

Crop year	North Brazil						South Brazil					Total all Brazil
	Ceará	Maranhão	Paraíba	Pernam- buco	Rio Grande do Norte	Other ¹	Total	São Paulo	Paraná	Minas Gerais	Other ²	
AREA												
Average:	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres	1,000 acres
1925-29	218.5	115.3	282.8	217.1	202.7	253.3	1,289.7	123.1	1.5	56.5	21.1	202.2
1930-34	275.4	198.0	331.6	289.7	213.5	406.2	1,714.4	662.9	20.3	144.8	24.2	852.2
1935-39	469.4	90.6	540.0	407.1	307.8	491.5	2,306.4	2,904.9	45.7	323.8	38.7	3,313.1
1940-44	388.5	79.5	420.9	375.4	310.7	254.8	1,829.8	4,051.2	95.9	100.8	50.4	4,298.3
1945-49	687.3	133.4	531.6	423.2	669.3	265.9	2,710.7	2,975.2	126.3	115.9	60.5	3,277.9
1950-54	784.3	164.4	655.9	555.0	748.7	364.3	3,272.6	2,597.4	215.2	219.5	123.8	3,155.9
1955-59	947.4	244.1	826.4	706.1	832.9	515.4	4,072.3	1,722.2	359.9	318.6	109.1	2,509.8
1960-64	899.5	226.7	603.0	563.2	641.0	479.7	3,413.1	1,034.9	419.6	255.6	119.0	1,829.1
Annual:												
1965-66	2,167.1	372.9	1,043.5	811.7	1,211.7	926.4	6,533.3	1,644.0	675.0	454.9	199.9	2,973.8
1966-67	2,420.2	333.7	1,117.0	747.6	1,174.0	864.9	6,657.4	1,105.0	668.8	410.8	166.7	2,351.3
1967-68	2,488.6	240.8	1,160.7	861.7	1,223.3	865.3	6,840.4	1,061.9	772.7	369.0	185.3	2,388.9
1968-69	2,754.6	259.1	1,154.3	912.1	1,260.2	908.3	7,248.6	1,160.8	1,035.3	346.4	240.7	2,783.2
1969-70	2,968.1	274.4	1,178.8	933.4	1,281.7	945.4	7,581.8	1,608.0	1,240.7	381.2	257.7	3,487.6
1970-71	3,224.0	284.0	1,252.7	889.0	1,133.6	885.4	7,668.7					11,069.4
PRODUCTION												
Average:	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³	1,000 bales ³
1925-29	61.9	46.2	100.1	75.9	74.6	75.4	434.1	40.1	0.6	21.0	8.0	69.7
1930-34	68.7	47.9	103.2	78.0	72.6	100.9	471.3	246.3	8.3	41.0	5.4	301.0
1935-39	140.1	31.2	179.2	120.4	105.1	138.0	714.0	1,116.2	18.9	98.0	13.5	1,246.6
1940-44	115.1	24.8	128.3	81.3	93.0	68.7	511.2	1,598.4	38.1	31.0	17.3	1,684.8
1945-49	168.3	25.3	111.7	84.7	117.6	63.0	570.6	958.3	55.9	41.7	18.7	1,645.2
1950-54	168.2	37.7	115.1	80.3	102.7	75.1	579.1	1,110.1	89.0	76.2	39.5	1,314.8
1955-59	198.5	54.5	154.9	100.4	126.5	114.5	749.3	830.8	192.8	97.4	35.7	1,156.7
1960-64	199.3	57.4	125.0	86.3	103.0	115.0	686.0	607.0	274.3	75.9	52.8	1,010.0
Annual:												
1965-66	411.5	85.2	243.1	143.3	182.3	228.0	1,293.4	1,048.0	482.5	148.7	90.9	1,770.1
1966-67	372.7	46.8	177.4	131.7	146.1	182.5	1,057.2	676.5	450.1	131.6	74.2	1,332.4
1967-68	446.6	33.7	194.2	160.7	184.6	212.3	1,232.1	747.8	748.6	116.8	88.3	1,701.5
1968-69	517.1	36.8	201.4	161.8	172.0	236.8	1,328.9	835.9	790.3	116.7	147.1	1,890.0
1969-70	505.8	39.6	199.5	155.9	159.7	248.7	1,309.2	1,015.2	794.5	133.5	137.3	2,080.5
1970-71												3,389.7

¹ Includes Alagoas, Amazonas, Bahia, Pará, Piauí, and Sergipe. ² Includes Espírito Santo, Goiás, Mato Grosso, Rio de Janeiro, Rio Grande do Sul, and Santa Catarina.

³480 lb. net.

Derived from figures from *Anuário Estatístico* and other reports of the Ministry of Agriculture.

Rainfall and temperature in practically all of the southern area is adequate for producing cotton. Distribution is not ideal, but the latter months of harvest tend to be generally favorable for gathering the crop. Except for a small coastal band, cotton can be grown on almost all of the tillable land in São Paulo State. However, with present cost-price relationships, it is unlikely that it could be grown at a sufficient profit to claim the use of land in most areas where it is not now grown. Much of the northern half of Paraná and a sizable part of Minas Gerais present a similar situation. In addition, there are large areas of Goiás and Mato Grosso States where cotton could be cultivated if economic conditions were to make it sufficiently attractive.

In the 1930's and subsequently, rapid expansion of cotton acreage and production in South Brazil has tended to coincide with heavy clearing of forest land. At first, it was forests in western São Paulo that bulked large in the total. Later, that State's vast forest areas ceased to be a major factor because they had been cleared from the better soil areas. Northwestern Paraná, on the other hand, still had large areas of forest land, and much of the expansion of cotton acreage in that State during the past decade and a half has been on recently cleared forest land. Recently, land clearing has subsided in Paraná also, and it is hard to ascertain how much of the remaining forest land is in good soil areas. To the extent this is the case, clearing may be resumed whenever income prospects encourage such investment.

It is fairly typical around the world that in a period of rapid expansion of agriculture in total, or of a particular product such as cotton, much land may be planted that is ill-suited to the crop in question. This was the experience of Paraná with respect to cotton. In some instances, use of ill-suited land for cotton may have represented an error in judgement but in other cases, it was deliberate. For example, farmers might have been aware that, through time, their forest land was better suited for pasture than for cotton. Even so, they recognized that clearing was expensive, that cotton could be grown on the land, and that cotton prices were sufficiently attractive to offset much or all of the cost of land purchase and clearing in the few years of cotton farming.

Many farmers appear to have been successful in their operations, and they now have valuable farms on a debt-free or nearly-debt-free basis. Some of those who came later, and had fewer high profit years from cotton, have not fared so well financially. Now farmers are in the process of shifting some of the land that was devoted to cotton when first cleared to other uses which under today's circumstances promise to be a satisfactory long-term use.

There appears to be general agreement that Mato Grosso still has relatively large amounts of forest land that would, if cleared, be suitable for crop or livestock production. There, too, the rate of land clearing now appears to have been greatly reduced.

To a considerable extent, cotton's role in South Brazil has been closely related to that of coffee. In the past, poor returns from older coffee plantings, occasioned either by low prices or by frost damage or other reasons, prompted farmers to plant cotton between rows of coffee trees while awaiting a more favorable coffee situation.

Also, when badly eroded coffee lands or fields with depleted fertility were no longer fit for further coffee production, farmers frequently reverted, at least in the short run, to cotton production. This was especially true on smaller coffee farms that were too small to support cattle operations.

Coffee acreage is constantly undergoing change, since coffee is planted in newly cleared jungle areas as well as in older farming areas. Land from which coffee trees are pulled may either be replanted to higher yielding strains of coffee or devoted to some other crop or to livestock use. In years past, it sometimes was entirely abandoned if its continued use promised to be unprofitable. On land that is still well suited for coffee, cotton or other crops are normally weak competitors.

The decision whether to abandon coffee production on a particular piece of land is not always a judgment matter. For example, in parts of Paraná and São Paulo a hard freeze can virtually make the decision for a farmer—at least in the short run. More often than not, however, the decision to pull out coffee trees and shift the land to another use is a deliberate management choice, which takes into account the anticipated profitability of the various alternatives bearing in mind the risk and timespan associated with each.

Some years ago one factor to consider was the Government program which encouraged eradication of low-yielding coffee. It was not unusual for small farms near large and growing cities to find vegetable crops in a strong competitive position, nor for cattle to have a strong appeal on large operations, especially if prospective crop yields were below average. Now that a growing number of farmers are farming more scientifically, it is increasingly common to find low-yielding coffee groves being replaced with new coffee plantings that will be operated more intensively.

One new element, which has so recently entered the picture of competitive crop relationships that it is difficult to assess its significance for cotton, is coffee leaf rust (*Hemileia vastatrix*). If coffee rust should spread into major coffee areas of São Paulo and Paraná, a decision would have to be made whether to eradicate large numbers of trees



Left, tree cotton in northeast Brazil. Central stalks live from year to year, and new cotton is produced on wood that develops after the start of the rainy season. Above, Brazilian tree cotton during first year of growth.



Above, cotton ready for picking in Parana, southern Brazil. Right, Parana cotton growing in newly-cleared farmland. (Photos from Indus-fibra; Londrina, Parana)





Above, a ginning complex in southern Brazil. Left, unloading cotton at gin in western Sao Paulo. High moisture content cotton is spread in foreground to dry. Lower left, seed cotton is stored in the open at Brazilian ginning operation. Below, preparing 1970 standards for Sao Paulo cotton (photo from Bolsa de Mercadovias de Sao Paulo).



and perhaps replace them with rust-resistant varieties or to gain a large measure of control by means of an intensive spraying program. On any given farm, the appearance of rust could be expected either to reduce income from coffee or increase the expense of producing coffee or both.

These developments would make the farmer interested in generating more income from some other line of production, and cotton might well prove to be one of the key crops to be expanded. At present, one can only recognize the possibility and watch developments with respect to coffee rust. Only later can its impact on cotton production be approximated.

Sugarcane is a crop that gives cotton and even coffee strong competition for high-yielding land to the extent that milling capacity is available. Also, there is quite close competition among several annual field crops—especially cotton, corn, soybeans, peanuts, and rice. By and large, peanuts are most competitive in the sandier soil areas but give much less competition to cotton on the red soils, and rice is relatively stronger in poorly drained areas than on well-drained areas. Weather play a part in the competitive picture inasmuch as good moisture conditions in August on soils that are well suited for peanuts may encourage farmers to plant peanuts on land that otherwise would have been planted to cotton.

Over and above these general competitive relationships, based on access to processing establishments, markets, and soil characteristics, choice of crops in any given year reflects relative profitability in the previous year and prospects for the year in question. The dynamics of these competitive relationships is evidenced by the wide swings that have occurred over the past decade in the acreage of cotton, corn, and peanuts and by the current upsurge in soybean acreage, although soybeans is still a very new crop in cotton areas.

Brazilian cotton producers (the landowners) as a class have not been as well organized as coffee producers, nor does cotton production carry community status equal to coffee or livestock production. Agricultural laborers, too, traditionally have preferred to work with coffee or livestock, as these enterprises provide stable employment on a year-round basis.

Northeast.—In the Northeast, three areas and kinds of cotton production must be delineated. First is the upper coastal cotton area, lying behind the immediate coastal zone, where rainfall is too heavy for cotton. Rainfall in the upper coastal area, however, is customarily from 25 to 40 inches, and is less than the amount of upland-type Mata cotton is grown. Inland from the upper coastal cotton area, which ranges in width from 5 to 100 miles, lies the second region—an area of lower rainfall where both annual-type Mata and perennial-type cotton are grown. Cotton grown in this area is known commercially as Sertao cotton. Still further inland, where rainfall is normally inadequate for annual cotton, is the Serido cotton area, where only perennial cotton is grown.

Several decades ago, the Northeast was Brazil's leading cotton-producing area. However, leadership was lost to South Brazil in the mid-1930's. While the Northeast now accounts for only about one-fourth of Brazil's total production, it accounts for just over one-half of the nation's cotton area. There has been no recent slackening of interest in cotton in the northeastern cotton region. In fact, cotton acreage in that area has expanded rather steadily for many years.

The quality of cotton acreage statistics for the Northeast leaves much to be desired. Variations in spacing of cotton in and between rows and widespread interplanting of other crops contribute to the difficulty. Brazilian official statistics report acreage of cotton here to be 7.7 million acres in 1970-71. This is presumably a gross acreage inasmuch as trade sources, FAS, and the International Cotton Advisory Committee consider the acreage to have recently been about 3.1 million acres.

About one-third of the total, or about a million acres, is in the State of Ceará, where a major portion of the Sertao cotton is grown. Ceará is followed in importance by Paraíba, Rio Grande do Norte, and Pernambuco. Smaller acreages are planted in Maranhão, Sergipe, Bahia, and several other States. Over the past decade, much of the acreage expansion has taken place in Ceará, but Rio Grande do Norte and Paraíba also have had substantial increases.

Cotton does not fit into an intensive cash crop economy in the Northeast as it does in the South. Northeastern perennial cotton areas are generally characterized as predominantly subsistence farming areas. Periodically, production of food crops and cash returns here have fallen even below subsistence levels, and the outflow of farm workers to nearby cities has become much greater than normal. This generally happens in drought years. However, when rains come, the cotton will start to grow again, and returning families can expect their cotton to have survived and to provide them with a source of cash income after a few months. Drought years do kill many individual plants and some fields so that production does not always return to normal the next season, and more than normal replanting may be necessary.

In the Northeast, cotton holds a comparatively strong competitive position and enjoys relatively higher prestige than in South Brazil. There is, however, a decided tendency to take cotton somewhat for granted, even though it is considered a relatively reliable cash crop. For best results, farmers are advised to give cotton the exclusive use of land, but they characteristically interplant it with such crops as corn, beans, and castorbeans; and even spineless cactus is at times planted to supply cattle with an additional grazing crop in dry seasons. Cotton is planted on a sizable share of the region's cropland. It encounters little economic competition as a cash crop from other crops in Northeast Brazil. Sisal has gained some importance since World War II, but it does not appear that much, if any, of its growth has been at the expense of cotton. Corn and beans also account for a sizable part of the area devoted to crops.

Production practices

In South Brazil, cotton is planted in October and November and harvested mainly from March through June. Generally, the best results are obtained in São Paulo and Paraná when the cotton is planted in early October. Planting after mid-November results in greatly reduced yields. Weather at harvest time also favors cotton planted in early October.

Even in areas where frost or cool weather is not a major factor in planting and harvesting dates, early planting is desirable so that picking can be finished before coffee harvesting begins and labor becomes scarce. In the Northeast, both the annual Mata cotton and new plantings of the perennial cottons are planted from February through May, and harvesting takes place from August through January.

In South Brazil, much of the cotton is produced on farms ranging in size from several hundred acres to several thousand, although there are owners, renters, or sharecroppers who typically operate holdings of 15 acres or less.

Many of the large farms are professionally managed for absentee owners. Cotton acreage is allocated to tenants or hired laborers on the basis of their known ability, the quantity and quality of the equipment available to them, and often the size and composition of their families.

Hand operations, and one man with a mule, still play important roles in cotton production although the use of tractors—especially for land preparation—is fairly widespread where the land has been cleared long enough for logs and stumps to pose no serious problem. Some farmers have completely displaced draft animals with tractors.

Farm credit is available on what an “outsider” would think of as favorable terms. A farmer with established credit and a dependable record for repayment can obtain production credit without difficulty.

Credit facilities also are available for financing the purchase of farm machinery. Loans for machinery purchase can run up to 5 years at interest charges that are less than the continuing rate of inflation. This would appear to encourage farmers to invest in all the machinery that can be used efficiently. However, since the Brazilian farmer is still 100-percent dependent on hand picking—which on many farms means maintaining a resident labor force that must be provided employment throughout much of the year—it can at times be more profitable to follow traditional labor-intensive farming methods.

Of late, farmers in parts of São Paulo have experienced some difficulty in obtaining pickers, and picking rates have risen substantially. Many farmers are therefore wondering whether they should consider investing in mechanical pickers.

Plus factors for such a development would include: The greater speed with which the crop could be harvested, thereby lessening storm losses; less dependence upon an uncertain supply of handpickers; having a practical alternative to the high wages for handpicking that may prevail in almost any season and; the possibility of expanding cotton acreage to a higher level than might be prudent if it were necessary to rely entirely upon handpicking.

Contrasting minus factors include: The often ill-suited field size, shape, and terrain for machine harvesting; the prevailing pattern of relatively crooked and uneven-width rows, ranging from an intended width of about 28 inches to 36 inches, which would almost necessitate altering the entire system of preharvest operations so as to effectively utilize the pickers; the extensive changes that would be needed in gin machinery and their cotton handling methods to minimize grade losses.

These pros and cons are clearly understood by the cotton leadership in the State of São Paulo. To obtain better information on which decisions can ultimately be based, a few mechanical pickers are being purchased and will be studied as they operate under Brazilian conditions. Even if the results should encourage their introduction on a commercial scale, it would appear that they would exert no material impact on the Brazilian cotton situation over the next 3 or 4 years.

In terms of total production, larger farm units operating with wage labor or supervised sharecroppers account for most of the production. The larger cotton farms appear to be in the better soil areas, to have the highest average yields, the most favorable profits, and the more stable acreage trends. In 1970-71, for example, most of the shifting from cotton to other crops is believed to have taken place on medium-size and smaller farms.

In the Northeast, as in the South, large farms tend to dominate crop production. Especially common in the dry interior are large operations that use either share tenants or day laborers for cotton production. Of course, the low productivity of the arid portions of the region necessitates relatively large acreages per farm family.

Nevertheless, according to a survey made some years ago, over four-fifths of the farms in the Northeast are less than 250 acres in size. Land preparation, planting, cultivation, and harvesting are all done largely by hand. The major agricultural implements on many farms are hoes and machetes. Most farmers own cattle, but animal power is rarely used for draft purposes other than transportation. Perennial cotton plants are characteristically spaced from several feet to several yards apart—with 8 feet by 8 feet being the recommended spacing. Even the Mata cotton may be planted in wide rows so that the field can be interplanted with some other crop or crops.

Fertilizer.—Virtually no fertilizer is used on most crops in the Northeast. The situation is different in the South, where many of the more efficient farmers now fertilize their crops. In general, soils in southern cotton areas are relatively fertile compared with those in the rest of Brazil; but even here, fertility is exhausted rapidly under intensive crop use. Most soils that have been cropped for several years become acid and badly leached.

Research has shown that cotton is quite responsive to soil treatment with nitrogen, phosphate, potassium, lime, and several minor elements. Cotton now receives about 10 percent or so of the limited quantities of fertilizer used in South Brazil. It has been estimated that about one-third or more of the cotton in São Paulo and Paraná is not fertilized. In both States, the share of farmers using fertilizer on cotton has increased rapidly in recent years.

At present, much of Brazil's nitrogen and phosphate and all its potassium are imported. Expansion of domestic production of nitrogen and phosphate is underway, and Brazilian fertilizer producers are sensitive to the keen competition provided by the low prices of imported fertilizer material. The nation does not now produce potash, but feasibility studies for its production have been undertaken.

Brazilian farmers now have much more information and technical assistance on which to base their fertilizer use than was the case even a few years ago. Alert fertilizer companies realize that their own well being is closely tied to the farmer's. This being the case, they are now staffed so as to help a farmer obtain soil tests, which provide a basis for fertilizer recommendations that are best suited for the farmer's needs. Some of the companies also have agronomists who are qualified to advise farmers on cultural practices that should contribute to high yields and profitable operations. The Government also promotes the wise use of fertilizer by providing loans for its purchase, which are repayable after the crop is harvested and marketed. Prior to July 1, 1970 such loans carried no interest.

Pest and disease control.—Cotton insects often cause considerable damage to the crop in Brazil. The bollworms, both pink and common, are considered the most destructive. Other insect pests frequently causing trouble in local areas include the leafworm, spider mites, aphid, several sucking and cutting insects, and ants. Brazil does not have the cotton boll weevil.

Virtually no insect control measures are carried out in the Northeast. In fact, it is sometimes contended here that partial defoliation by insects aids harvesting. In the South, control measures are applied by many farmers. Up to 12 spray applications are made by a few farmers in years of severe insect attack. Insecticides are applied with hand and with tractor equipment. The 1970-71 crop experienced relatively light attacks by insects.

Cotton diseases are not normally a problem in the Northeast, although various wilts, mildews, and leaf spots are sometimes troublesome when local conditions are conducive to disease development. Diseases are more serious in the South, where rainfall during the growing season encourages their development. A measure of control in the past was the withdrawing of fields from cotton production after a few years. Now that less new land is available for clearing, more attention is being given to disease-resistant varieties and to cultural practices, such as crop rotation, that help retard the impact of diseases.

Fusarium wilt is a serious problem in the South and has been partly responsible for considerable reduction in cotton acreage in several areas of São Paulo State and Paraná. Resistance to Fusarium has been a major objective in cotton breeding work in the South, and considerable success has been achieved. In addition to Fusarium wilt, Anthracnose, Mosaic, Verticillium wilt, and other diseases have been identified in the South. While not widely troublesome in most years, these diseases cause localized problems.

Cost of production

In any commercially oriented farming area, like South Brazil, the cost of production of various crops is a key factor in deciding what cropping pattern to follow. However, costs are but one of several important considerations. Others include expected receipts and net returns, availability and dependability of markets, capital requirements, credit availability, degree of risk encountered, and alternative opportunities.

Costs vary considerably from one area to another within the country and from farm to farm within the same community.

Within any given farming area, differences in cost of production are closely associated with yield differences. In almost any year the farmer who succeeds in obtaining high yields will more than likely have a below-average cost of production and a reasonable profit. In contrast, even in the years of highest prices, the farmers with the lowest yields are likely to experience losses.

Over the past decade the indications are that Brazilian cotton farmers who had a yield of say 300 arrobas of seed cotton per alqueire—equivalent to 1,659 pounds of seed cotton or about 559 pounds of lint per acre—appears to have made a profit each year. Farmers with yields of 200 arrobas of seed cotton—or the equivalent of 373 pounds of lint per acre—appear to have made a profit in all but one year, 1966-67, and in some areas they even made a profit that year.

As was stated earlier, the 1969-70 crop of cotton was a disappointment to the many farmers in South Brazil. Yields, production, and profitability turned out much lower than had been hoped for. Also, other crops did especially well, and many farmers responded in 1970-71 by cutting back on cotton and expanding acreages of alternative crops such as corn, soybeans, and peanuts.

Indications as of May 1971 were that farmers who had maintained an above-average yield or who had raised their yields to favorable levels made a higher profit in 1970-71 than in 1969-70.

Indications are that a farmer with a yield of 559 pounds of lint per acre will make a good net return this year over and above adjusted total costs. At an assumed price of 8.2 cents per pound for seed cotton, the net return would be \$34.42, or at an assumed price of 8.9 cents it would be \$46.03. This latter figure is about double the net return in 1969-70. To provide comparability with U.S. practice, adjustments have been made in the Brazilian data

Estimated cost of producing cotton and returns in South Brazil, 1970-71

Item	Assumed production lint per acre ¹			
	559 lb.		373 lb.	
	<i>Dol. per acre</i>		<i>Dol. per acre</i>	
All costs prior to harvest	53.29		40.41	
Harvest expenses	23.30		15.65	
Ginning (@ \$12.50 per bale)	14.27		9.50	
Direct costs	90.86		65.56	
Land and overhead	25.03		19.29	
Total cost.	115.89		84.85	
Value of seed (@ \$54 per ton)	29.70		19.79	
Adjusted direct cost	61.16		45.77	
Adjusted total cost	86.19		65.06	
	<i>Cents per lb.</i>		<i>Cents per lb.</i>	
Assumed price received for seed cotton	8.2	8.9	8.2	8.9
	<i>Dol. per acre</i>		<i>Dol. per acre</i>	
Return from marketing seed cotton	136.04	147.65	90.69	98.43
Ginning	14.27	14.27	9.50	9.50
Adjusted return for value of lint ²	120.61	132.22	80.40	88.14
Net return over adjusted direct cost	59.45	71.06	34.63	42.37
Net return over adjusted total cost	34.42	46.03	15.34	23.08
	<i>Cents per lb.</i>		<i>Cents per lb.</i>	
Adjusted direct cost	10.9	10.9	12.3	12.3
Adjusted total cost	15.4	15.4	17.4	17.4
Adjusted price received	21.6	23.6	21.6	23.6

¹ Assumed lint outturn of 33.7 percent.

² Return from marketing seed cotton less value of seed plus ginning.

for both ginning and the value of seed. Similarly, a farmer with a more average yield of 373 pounds of lint per acre would have a net return over and above adjusted total cost of \$15.34 at an assumed price of 8.2 cents per pound of seed cotton or \$23.08 at an assumed price of 8.9 cents. This latter figure is about three times the corresponding figure for 1969-70. The accompanying table presents the derived adjusted direct and total costs as well as the adjusted price received for lint under the two yield and two price assumptions.

The costs based on a yield of 373 pounds of lint may be reasonably typical of the situation in the State of São Paulo, where yields are currently estimated to average 389 pounds this season—up from 372 pounds last season. Paraná is less well situated, however, from a cost and income standpoint for yields are currently expected to average 287 pounds this season—down from 300 pounds last season—and prices are averaging a bit lower than those in the table because of the ICM tax.

As of late May, it was still not known at what price most farmers in South Brazil would in fact sell their cotton. At the time, ginners were offering the equivalent of about 8.2 cents per pound for seed cotton, and farmers were asking at least 8.9 cents. This makes it especially difficult to project what farmers are likely to do in 1971-72.

Nonetheless, it appears unlikely that cotton acreage will change much in South Brazil this season, and yields could well improve, making for a moderate expansion in total production. Among the major producing States, Paraná is likely to see some shift away from cotton to major competitors like corn, peanuts, or soybeans as a result of cotton farmers' disappointment with returns. São Paulo's acreage is expected to hold steady, and other States in the region will probably continue to expand.

Financing and extension

In the past, gin companies supplied sizable amounts of credit to cotton growers in the South. The grower received production credit from his landlord or directly from a ginner provided the grower was also the landowner. Often the landlord or other local money lender obtained much of his money for lending purposes from the ginner. Relatively little credit was available in the Northeast, by contrast, and cotton merchants were probably the major source in that region.

In recent years, however, a growing amount of financial aid has been made available to farmers through agencies and branches of the Bank of Brazil and State banks which supply credit to farmer cooperatives and individual farmers.

When various Brazilians were questioned about the effect any restrictions on credit may have had on the reduced cotton plantings in 1970-71 the invariable answer was that ample credit had been available and that the reduction was the farmer's decision and not a reflection of credit policy. As one might expect, farmers who had a large increase in carryover of debt from the previous year found a lesser amount of new credit available to them this season. This reflected general credit policy, however, and was not intended to curtail the production of any given crop or crops.

Farmers have access to normal production credit, credit for the purchase of new or used machinery, and special credits for the purchase of fertilizer. Normally, production credit is only for the producing season, and debts are expected to be repaid shortly after the crop is harvested. Machinery loans, on the other hand, can be for as long as 5 years. Interest rates of 12 percent per annum plus 3 percent commission may seem high by American standards, but with cost of living increases running as much as 25 percent in some years, the farmer repays the loan with cruzeiros worth less than those he borrowed, meaning that the real charge on such loans frequently is a minus rate.

In addition to the extension activities carried on by public agencies, there is an effective organization, Indusfibrá, in Paraná that is financed by the cotton-marketing firms operating in that State. This organization, which has been operating for a decade, has a small but highly effective staff that works directly with farmers on behalf of efficient cotton production. Various fertilizer and insecticide companies doing business in South Brazil also have professionally trained agricultural workers on their staffs to help farmers with their production problems.

Most of the facilities for providing farmers with technical know-how with respect to cotton production have come into existence in the past 15 years, and much of the farmers' success in putting cotton production on a more businesslike basis is attributable to such extension activities and the research which underlies present-day cotton varieties and recommended production practices. In this regard, the farmers in South Brazil are far more fortunate than those in the Northeast, where both research and extension are much more limited.

Government policy and development programs

Brazil is moving on a number of fronts to expand production of most products, including cotton. There are a number of reasons for Brazil's interest in encouraging cotton production. Cotton production provides a large amount of gainful employment for the many thousands of people who produce, market, and process the cotton lint and cottonseed. It provides much-needed foreign exchange earnings; serves as raw material for two important industries, oilseed crushing and cotton textiles; and supplies a number of byproducts that are themselves important. The production of cotton also makes important contributions to the demand for farm machinery, fertilizer, insecticides, trucks, and other inputs.

Even though it is desirous of seeing cotton production expanded, the Government does not directly promote cotton by discouraging production of some other crop. Instead increased production of all products is encouraged in line with national policy for general economic development. The availability of production credit, including special incentives for buying and using fertilizer has already been discussed in an earlier section, but mention here is also justified since both programs are integral parts of Brazil's total development program for cotton.

There have been times, like the current season, when reduced cotton production has necessitated choosing between cutting back on domestic mill consumption or on exports of raw cotton. Under such circumstances the decision has always been to sustain the level of mill consumption. In some past years, the policy has been implemented by giving export quotas to export firms at such a rate and in such an amount as will assure that ample cotton will be available for domestic mills. This year, a small importation of longer staple cotton has been authorized because of the short crop of such cotton in the Northeast. Some of this imported cotton has been obtained from the United States.

For years, Brazil has followed a policy of providing price supports on a number of the more important farm products. Its system for cotton operates quite differently from that of the Commodity Credit Corporation in the United States. Brazil has two basic rates—one for seed cotton and one for lint cotton. Of course, the Government has no facilities for the direct handling of seed cotton, so the seed cotton support price is in reality a reference price which serves several practical purposes. In the first place, it helps in production planning by providing farmers and their sources of credit with something of a floor price. It also provides the ginning companies with a base price below which they cannot pay if they are to be eligible to borrow at the support price for lint to help finance movement of the crop. It is expected that the loans will be repaid, and only rarely has cotton been forfeited to the Government under the price support program.

With the rate of inflation Brazil has experienced over a number of years, it is generally expected that each year's support prices will be higher than in the previous year. In a Decree dated August 1970, the Brazilian Government established the price of 10.50 cruzeiros per arroba of 15 kilograms for unginned cotton for South Brazil in 1970-71. This compares with 8.70 cruzeiros a year earlier. These levels at the time of announcements were equivalent to 6.9 cents and 6.4 cents, respectively, per pound of seed cotton. The support price for lint cotton in South Brazil was 30.67 cruzeiros per arroba for 1970-71, compared with Cr\$22.52 in 1969-70, or the equivalent of 20.1 cents and 16.5 cents per pound of lint. These supports relate to Type 5 cotton.

The Decree establishing minimum support prices for 1971-crop cotton in the Northeast was published in December 1970. It established a minimum of Cr\$11.50 per arroba for seed cotton, which compared with a level of Cr\$9.00 a year earlier. At the time of their respective announcements, these were equivalent to 7.1 cents and 6.6 cents per pound of seed cotton. For ginned cotton, the 1971 figure is Cr\$34.05, compared with Cr\$26.81 a year earlier. These were equivalent to 20.9 cents and 19.6 cents per pound of lint cotton. In the Northeast, the basis for price support operations is Type 3 cotton with fiber length of 34-36 mm.

To assist with the commercial movement of the crop, the Government has established a program of "rural promissory notes." The current program was set up by the Central Bank of Brazil in August 1968 (Circular No. 120). It enables the ginning companies to buy seed cotton from farmers and to pay for it with the rural promissory note, which becomes payable through the banking system within a stipulated period 3 or 4 months. Within this period, much of the cotton will have been ginned, and further credits, if needed, can be arranged, using ginned cotton as collateral. The farmers, in turn, can use these notes to repay loans. This system basically assures farmers and the gin companies, whether big or small, that ample credit will be available to finance the effective movement of the crop at harvesttime.

Where farmers are not pleased with the prevailing price at any given time, they can deliver cotton to the gin and fix the sale price at a later date of the farmer's own choosing. This is, in fact, fairly widespread practice, and trade

reports indicate that up to mid-May 1971, the price had been fixed on only a comparatively small part of the cotton thus far delivered in the current season.

In addition to its concern over the producer getting a fair price and the cotton trade being able to finance the movement of the crop, the Government also is interested in all foreign exchange earnings from cotton exports flowing into the banking system. To implement this objective, use is made of a system of minimum export prices. Cotton exporters are required to observe these minimums in making foreign sales and to turn in the foreign exchange obtained.

A few years ago aggressive export selling of Brazilian cotton drove the price lower than the published minimum. On this occasion, the export firms were able to demonstrate to the Government's satisfaction that the minimum should be lowered. This tended to support the thesis that the Brazilian Government was more interested in capturing all foreign exchange earned than in stabilizing the world price of cotton at any given level. The minimum export price for southern-crop cotton was raised from the equivalent of 23.5 cents to 25.0 cents per pound, f.o.b. Santos, in mid-November 1970, and raised further to 26.5 cents in March 1971.

For years, production of cotton for export was disrupted from time to time by developments in Brazil's overall financial condition. One such influence has been official manipulation of the exchange rates. At times, farmers have found it more profitable to produce some alternative crop for which the internal price was high because part of local requirements had to be imported at a high rate of exchange. In contrast, the prices of certain export crops, cotton included, were held down by means of artificially low exchange rates.

Also, there were times when the Government was unwilling to adjust the exchange rate at the beginning of each harvest season to reflect changes that had occurred in the internal price to producers, the value of cotton on the world market, and deterioration in the value of Brazilian currency. Under those conditions, pressures built up for the Government to alter the exchange rate to aid cotton exports, and farmers and cotton firms were hesitant to conclude sales until the outcome of the pressures on the Government was known. Where business was done, it was not unusual to find sales contracts governed by the price policy that was yet to be decided by the Government.

Some of the above problems have been alleviated by the current system of mini devaluations, under which the exchange rate is altered at various times through the year. The mini devaluations also appear to have the effect of causing farmers to feel that they derive the full benefit of the changes. Under the previous system, many believed that the benefit accrued mainly to others. Cotton exports are now handled on the same exchange rate as all other products.

Programs are in operation in the northeastern States to encourage farmers to plant more cotton, to plant improved varieties of cotton, and to adopt improved cultural practices. Although in many ways recognized as Brazil's No. 1 problem area, the Northeast regards cotton as one of the more dependable sources of cash farm income.

In March 1971, there was a trade report that the National Monetary Council had announced a program under which it will advance approximately \$30 million to farmers in the Northeast for agricultural development. The Ministry of Agriculture is to place special emphasis on the production of perennial cotton, and the farmer credits can run up to 5 years with payments to start in the third year. These loans will be at the rate of 12 percent per annum, 5 percent of which will be borne by the Government as a subsidy. In the Mata cotton areas, loans will be for a maximum of 1 year. It is expected that funds will be used mainly for the purchase of fertilizer, seed of improved varieties of cotton, and farm machinery.

Experience over the years suggests that some slow progress is being made. Over a period of 5 or 10 years, there may be a continued expansion of cotton acreage in the drier areas of the Northeast and maybe a general adoption of the improved varieties. However, it is doubtful whether cultural practices will be improved fast enough to have much effect on production in the Northeast within the next few years.

It is too early to assess the role that cotton may eventually play in the development of land in the São Francisco River Valley of the Northeast. Much of this land appears highly productive. However, much time and a huge investment would be required to complete such a development operation. To date, indications show that irrigated cotton in that area can be high yielding, but so are alternative crops. It is, therefore, questionable whether cotton will claim a large share of the irrigated land that may eventually be developed there.

Research and varietal control

The respective State Governments are largely responsible for activities in cotton research and for distribution of planting seed. Considerable work is done in seed selection and distribution; perhaps less, on problems related to

cultural practices. In terms of official research attention given to cotton, and to all its varied requirements and problems, the State of São Paulo ranks first by a large margin. Most other States depend upon São Paulo for much developmental work, although a few are becoming somewhat more involved in various cotton improvement activities. In the Northeast some cotton improvement work is being conducted by SUDENE—Superintendency for Development of the Northeast, in cooperation with the Pernambuco Agronomic Institute and the Paraíba Secretariat of Agriculture.

Cotton breeding and testing work in São Paulo is performed by the Agronomic Institute at Campinas, which in addition to having its own farm also operates a large network of farms throughout the State's cotton growing area. Through the years, the Institute has placed emphasis on increasing yields and staple length while at the same time maintaining or improving other fiber characteristics. In view of the rapid spread of Fusarium wilt, especially in the older producing areas of São Paulo, efforts to improve yields have required that attention also be given to developing resistance to wilt.

The actual yield record for seed cotton is shown in the following tabulation, which is based on simple 4-year averages of State average yields. In interpreting this information, it must be recognized that the increase in yields reflect improvements that have been bred into the newer varieties as well as gains that result from selection of soil on which to grow cotton and improved cultural practices.

	<i>Lb. of seed cotton per acre</i>
1946-47 - 1949-50	432
1959-51 - 1953-54	599
1954-55 - 1957-58	752
1958-59 - 1961-62	907
1962-63 - 1965-66	987
1966-67 - 1969-70	1,186

The dramatic improvement in staple length is more purely a reflection of the effectiveness of the cotton improvement program at the Agronomic Institute. As recently as 1955-56, some 22.6 percent of cotton production in São Paulo was 27 mm. or less in staple length, and only 8.8 percent was 29 mm. and longer. This contrasts sharply with 1968-69 when only 0.1 percent of the cotton in São Paulo was 27 mm. and less, and 99.9 percent was 29 mm. and longer. In fact, 47.3 percent was in the 32-34 mm. grouping. Paraná had a similarly small percentage in the 29 mm. and shorter groupings. In fact, 84.3 percent of the Paraná crop was in the 30-32 grouping.

In recent years, São Paulo has been raising the variety known as IAC-12, but IAC-13 is now being multiplied for commercial introduction. It is considered generally superior to IAC-12, and some of its strains are considered to be quite resistant to Fusarium wilt.

These and other varieties now being grown elsewhere in South Brazil are selections from such U.S. lines as Auburn 56, Rex, Deltapine, and an Acala strain introduced from the United States many years ago. Under local conditions in the South of Brazil, Auburn 56 rates favorably compared with other varieties grown in terms of staple length, and several other quality characteristics, including resistance to Fusarium wilt.

There is a fairly wide range in grade of Brazilian cotton from year to year, mainly because of widely varying weather during harvest. In some years when rainfall continues late into the harvest period, a relatively large share of the crop falls into the lower grades. South Brazilian cotton is graded on a number series, 1 through 9, with half-grades. In the Northeast, the same general system is followed except that half grades are not used. All below-grade cotton is classified as inferior to grade 9. Brazilian cotton standards do not permit an exact conversion into U.S. standards. However, Grade 5, the base grade, is roughly equivalent to Middling Light Stopped or Strict Low Middling Light Spotted. The trade concept of Grade 5 staple length is about 1-1/16 inches or better.

In 1969-70, cotton grades were generally considered to be below average. Of all the cotton classed in São Paulo, only 4.5 percent graded Type 5 and above, and 9.2 percent fell below Type 7. Corresponding percentages for Paraná as reported by the Paraná classing office in Londrina are 2.4 and 15.6 percent, respectively.

The rapid improvement in staple length of cotton in São Paulo reflects both the breeding work and control of seed distribution exercised by the State. In São Paulo, as soon as a variety proves itself to be superior to that being used, the Government supervises multiplication and distribution of the seed to farmers. Producers purchasing seed

from the Government must accept the strains being distributed. The State seed monopoly also has a campaign underway to treat all seed before distribution to control pink bollworm, which in some years has done a great deal of damage. Other State Governments in South Brazil also control seed supplies, but in general, the control is less restrictive than in São Paulo.

Staple lengths of cotton produced in specified States of Brazil

Staple length in millimeters	São Paulo ¹	Paraná ²	Minas Gerais ¹	Rio Grande do Norte ¹	Ceará ²	Pernambuco ³
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
24	—	—	—	—	—	—
24-26	—	—	—	—	0.1	—
25	—	—	—	—	—	—
26	(4)	—	—	—	—	—
26-28	—	—	—	(4)	.1	1.1
27	0.1	—	—	—	—	—
28	(4)	0.1	—	—	—	—
28-30	—	—	—	15.0	1.2	⁵ 16.9
29	.1	.2	—	—	—	—
29-30	—	.2	51.9	—	—	8.7
30	1.3	13.9	—	—	—	—
30-32	51.2	84.3	48.1	.8	9.4	5.3
32	—	.1	—	—	—	—
32-34	47.3	—	—	16.7	81.7	62.0
34-36	—	—	—	39.9	7.5	6.0
36-38	—	—	—	20.8	—	(4)
38-40	—	—	—	6.8	—	—
Total	100.0	⁶ 100.0	100.0	100.0	100.0	100.0

¹ Data for 1968-69. ² Data for 1969-70. ³ Data for 1967-68. ⁴ Less than 0.051 percent. ⁵ 28-29.

⁶ Includes 1.2 percent of cotton declassified, residues and losses.

Staple lengths¹ of cotton produced in the State of São Paulo

Year	27 mm or less	28 mm	29 mm	30 mm	30-32 mm	32-34 mm
	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>
1955-56	22.6	68.6	8.8	(2)	—	—
1956-57	41.5	53.9	4.5	(2)	—	—
1957-58	.8	14.7	77.0	6.2	1.1	0.1
1958-59	1.8	6.6	18.3	54.5	18.8	.1
1959-60	.5	3.0	20.8	60.8	14.6	.1
1960-61	.2	9.1	59.0	25.6	4.5	1.5
1961-62	.1	1.7	43.2	44.0	10.8	.1
1962-63	.2	.4	9.4	55.7	32.1	2.2
1963-64	.1	(2)	.8	24.4	74.5	.2
1964-65	.2	.1	1.8	27.7	70.2	—
1965-66	.1	(2)	.2	12.6	87.2	—
1966-67	.4	.2	1.7	11.5	70.8	15.4
1967-68	.1	(2)	.1	1.1	60.9	37.8
1968-69	.1	(2)	.1	1.3	51.2	47.3

¹ Many persons in the cotton industry consider South Brazilian cotton to be somewhat shorter than indicated in this table. Nevertheless, the improvement in staple lengths is obvious.

² Less than 0.05 percent.

Classification of cotton lint by grade in specified States of Brazil

Type	São Paulo ¹		Paraná ¹		Minas Gerais ²		Goiás ⁴		Ceará ¹		Rio Grande do Norte ²		Pernambuco ³	
	Bales	Percent	Bales	Percent	Bales	Percent	Bales	Percent	Bales	Percent	Bales	Percent	Bales	Percent
2	—	—	—	—	—	—	—	—	—	—	1,807	1.4	183	0.2
3	293	(4)	1	—	1,108	1.5	—	—	90,177	33.3	97,227	77.7	13,347	11.7
4	2,896	0.2	144	—	10,385	14.3	—	—	130,668	48.2	21,217	17.0	57,499	50.2
4-5	15,535	1.0	1,236	0.1	18,392	24.7	15	0.1	—	—	—	—	—	—
5	51,630	3.3	19,726	2.3	21,966	28.7	349	1.4	40,036	14.8	3,958	3.2	33,789	29.5
5-6	171,108	10.9	75,800	9.0	13,057	16.9	2,785	11.5	—	—	—	—	—	—
6	414,704	26.5	223,525	26.5	7,634	10.0	4,352	17.9	7,588	2.8	923	.7	8,042	7.0
6-7	507,937	32.5	221,826	26.3	2,495	3.2	8,299	34.0	—	—	—	—	—	—
7	256,883	16.4	170,252	20.2	431	.5	5,566	22.9	1,424	.5	19	(4)	1,511	1.3
7-8	99,662	6.4	79,477	9.4	57	.1	2,181	9.0	—	—	—	—	—	—
8	27,611	1.8	29,562	3.5	55	.1	652	2.7	455	.2	—	—	58	.1
9	10,350	.7	9,553	1.1	33	(4)	119	.5	657	.2	—	—	5	(4)
Inferior to 9	5,040	.3	3,010	.4	1	(4)	7	(4)	—	—	—	—	3	(4)
Total .	1,563,649	100.0	844,363	5 100.0	75,614	100.0	24,325	100.0	271,005	100.0	125,151	100.0	114,427	100.0

¹Data for 1969-70 season. ²Data for 1968-69 season. ³Data for 1967-68 season. ⁴Less than 0.051. ⁵Includes 10,251 sales (1.2 percent) cotton declassified, residues and losses.

In the Northeast, a program for improvement of Moco (perennial) cotton was initiated in the mid-1940's. It has resulted in the development of improved strains that appear under several different names. Sertao and Serido do not identify distinct varieties of cotton, but rather, these are commercially recognizable names for perennial cotton derived from the regions in which the cotton is grown. Moco is a local name for cotton properly classified as *Gossypium hirsutum*—variety Marie-Galante. This perennial type—sometimes called “tree cotton”—is capable of withstanding drought better than any other known variety. Its roots have been known to go down many feet in search of moisture.

“Tree cotton” produces only a moderate crop, if any, the first year, but starting the second year it hits its stride in terms of yield. In older fields, plant populations tend to decline, causing yields to taper downward. Typically, fields are allowed to produce for 6 years, or more. Some remain more than 10 years. Because of its resistance to drought, this perennial cotton is widely regarded by farmers as one of the best and most dependable cash crops in regions of scant rainfall.

Although farmers in the Northeast are at liberty to plant any seed available, there is a growing interest among Brazilian leaders in getting farmers to use improved seed in new plantings. However, progress to date has not been great, and even if the idea of using improved varieties were to catch-on, several years would be required before any real improvement in the perennial crop would be noted, inasmuch as Moco cotton is replanted only every 7 to 10 years.

Fiber and spinning characteristics among the various strains of improved Moco cotton are essentially comparable, and all improved strains are quite superior to the unimproved perennial cotton now widely produced. Improved Moco fiber is relatively uniform, fairly strong (Pressley readings between 90,000 and 100,000 lbs. per square inch are normal), and fine (micronaire readings generally range between 3.2 and 3.8). By American standards, the staple length of improved Moco usually falls between 1-1/4 inches and 1-3/8. The accompanying table on staple lengths shows that Rio Grande do Norte raises a higher percentage of longer staples than does Ceará or Pernambuco.

Prices and marketing

For many years, Brazilian cotton has been one of the major growths of cotton in world trade, and it therefore differs from many of the world's growths which have price quotations for only a few months in most years. In all major import markets, Brazilian cotton is typically quoted throughout the year. Similarly, spot prices are available for São Paulo and monthly prices are available for a number of interior points in the State of São Paulo.

During the international marketing year August 1969-July 1970, Brazilian spot prices at São Paulo reflected average premiums over Type 5 (the base grade) of 69 cent points for Type 3 and 55 points for Type 4. These represent premiums of 1.62 percent and 0.97 percent, respectively. In the same year, the premium for Strict Middling cotton in the designated spot markets in the United States averaged 38 points, or 1.7 percent over the price for Middling 1-inch cotton.

On the discount side, the average for Type 6 was 141 cent points under Type 5, Type 7 was 350, Type 8 was 510, and Type 9 was 569 points. These represent discounts from Type 5 of 6.6 percent for Type 6, 16.5 percent for Type 7, 24.0 percent for Type 8, and 26.8 percent for Type 9. With respect to U.S. cotton, Strict Low Middling is sold at a discount of 170 points or 7.7 percent and Low Middling at a discount of 310 points or 14.0 percent.

The marketing system for Brazilian cotton does not have separate premiums and discounts for cotton of different staple lengths but instead includes differences for staple within the premiums and discounts for the various grades of cotton. Presumably, this means that the higher grades include cotton that is superior to Type 5 so far as grade in the U.S. sense is concerned *and also* cotton that is longer in staple than the average for the crop. At the other end of the classification the low grades include both lower grade and shorter staple cotton. These differences between official Brazilian and U.S. systems of describing cotton quality make it difficult to make precise comparisons of the two growths on the basis of regularly published trade data. It is recognized that in actual practice most of the export business, and many domestic sales are made on the basis of private types that represent both grade and staple.

Brazil maintains a guaranteed floor price for cotton as was explained in the section on Government policy. From the basic price, there are small differences for different locations. The Government stands ready to implement the support level; but, typically, producers have received market prices above it. The specified prices are the minimum to be received by the producer or his cooperative. They are the base prices minus freight costs to consuming centers, finance agents' commissions, sales taxes, rural social security taxes, and other expenses.

Cotton prices per pound in São Paulo, Brazil, Type 5

Year	August	September	October	November	December	January	February	March	April	May	June	July	Average
1964	Cruzeiros per arroba ¹ 8.26	Cruzeiros per arroba ¹ 9.75	Cruzeiros per arroba ¹ 10.68	Cruzeiros per arroba ¹ 10.70	Cruzeiros per arroba ¹ 10.80	Cruzeiros per arroba ¹ 12.32	Cruzeiros per arroba ¹ 12.50	Cruzeiros per arroba ¹ 12.47	Cruzeiros per arroba ¹ 11.90	Cruzeiros per arroba ¹ 12.59	Cruzeiros per arroba ¹ 13.76	Cruzeiros per arroba ¹ 13.95	Cruzeiros per arroba ¹ 11.64
1965	13.80	13.80	13.99	14.98	15.50	15.40	15.18	14.42	14.40	14.40	14.40	14.40	14.56
1966	14.40	14.40	14.41	15.11	15.59	17.14	18.63	19.00	19.00	19.15	19.28	19.30	17.12
1967	19.63	20.69	22.29	25.78	26.90	28.50	28.50	27.73	25.58	24.08	24.05	24.80	24.88
1968	25.44	26.80	27.07	28.04	26.95	26.34	26.00	23.20	25.54	26.47	26.73	26.80	26.28
1969	26.80	26.97	28.06	29.82	30.20	30.20	30.20	30.22	31.60	33.49	35.16	37.65	30.86
1970	40.21	41.20	41.86	47.55	48.34	50.10	50.25	45.62	45.50	—	—	—	—
1964	Cents per lb. 19.78	Cents per lb. 23.36	Cents per lb. 20.06	Cents per lb. 20.10	Cents per lb. 17.65	Cents per lb. 20.14	Cents per lb. 20.44	Cents per lb. 20.38	Cents per lb. 19.45	Cents per lb. 20.57	Cents per lb. 22.49	Cents per lb. 22.80	Cents per lb. 20.60
1965	22.56	22.56	22.87	20.41	21.11	20.98	20.68	19.64	19.62	19.62	19.62	19.62	20.77
1966	19.62	19.62	19.62	20.58	21.24	23.35	20.75	21.16	21.16	21.33	21.47	21.50	20.95
1967	21.86	23.04	24.83	28.71	29.96	26.76	26.76	26.04	24.02	22.61	22.59	23.29	25.04
1968	21.08	21.90	22.12	22.49	21.28	20.80	20.01	17.54	19.31	19.77	19.96	19.77	20.50
1969	19.53	19.65	20.16	21.02	21.19	21.19	20.71	20.35	21.28	22.21	23.32	24.48	21.26
1970	26.15	26.40	26.99	29.92	30.04	30.84	30.51	4.48	27.08	—	—	—	—

Source: *Revista dos Mercados* and other reports of Bolsa de Mercadorias de São Paulo and from FAS Cotton Division.¹ Arroba equals 15 kg. or 33.069 lb.

Cotton prices per pound of Brazilian Type 5, c.i.f. Liverpool

Year	August	September	October	November	December	January	February	March	April	May	June	July	Average
1964	Cents per lb. 27.74	Cents per lb. 27.66	Cents per lb. 27.70	Cents per lb. 27.75	Cents per lb. 26.56	Cents per lb. 26.70	Cents per lb. 26.79	Cents per lb. 26.82	Cents per lb. 26.85	Cents per lb. 26.90	Cents per lb. 26.57	Cents per lb. 25.48	Cents per lb. 26.96
1965	25.47	—	—	25.44	25.57	25.64	25.76	25.69	25.73	25.72	24.35	23.77	25.31
1966	23.77	23.77	23.80	23.79	23.78	23.94	25.98	26.83	27.00	27.01	27.05	26.58	25.28
1967	26.19	26.54	26.76	29.47	33.11	31.68	30.11	29.64	29.15	28.51	29.46	30.50	29.26
1968	30.60	30.30	29.21	27.61	26.17	26.56	26.34	26.15	26.15	26.15	25.65	25.59	27.21
1969	25.45	25.35	25.61	26.15	26.60	26.60	26.66	26.85	27.16	27.25	27.08	27.30	26.50
1970	27.46	28.16	28.60	28.82	28.09	29.10	29.86	30.75	30.60	—	—	—	—

¹ 10 months average.Source: *Cotton and General Economic Review*, Liverpool, England.

Traditionally, farmers feel that support prices are too low. They feel they should be at such a level as will return them a substantial profit, whereas, in fact, both the system and the level of support are designed to provide only a small profit in case the market price should fall.

All cotton produced in Brazil is handpicked, and virtually all is sold by farmers to the gins as seed cotton or delivered to their cooperatives. Cooperatives handle about 7 percent of the crop. Classers examine the seed cotton as it is received at the gins, and producers are paid on the basis of quality.

After the bags of seed cotton are examined for quality, they are entered into the gin stores so that like qualities are placed in each bin or compartment. Each bin is checked periodically for heat development. If heat is found, the cotton may be removed for drying or put through the drying equipment if the gin is so equipped and ginned.

A sample of each bale of cotton ginned in the state of São Paulo is sent from the gin to the Bolsa de Mercadorias in the city of São Paulo for classing. Paraná also has organized an official classing agency, which is located at Londrina and classes all cotton ginned in Paraná. Since much of the cotton produced in neighboring States is trucked into São Paulo or Paraná for ginning a large share of the southern crop is officially classed, but statistics are not always readily available to indicate the quality of each bale produced in each State. Classification work also is done in the major cotton-producing States in the northeast cotton zone.

Ginning facilities in Brazil are generally adequate to process the current cotton output. Moreover warehouse space is available for more cotton than is now produced. The westward movement of cotton in South Brazil has necessitated the movement of some gins to newer regions and has caused still others to serve rather distant producing areas. Thus, while no general lack of marketing facilities has hindered expanded cotton production, problems have developed in periods of most rapid acreage and production expansion; these have centered around the moving of ginning equipment and building of new gin storage facilities, or transportation of seed cotton substantial distances, because of the new areas.

Detailed data are not readily available on all of the gins in Brazil, but a report for the 1969-70 crop year in Paraná has been issued by that State's cotton classification office.

Paraná had 80 gin installations in 1969-70. Of these, 52 were single battery installations, 26 were double battery, one had three batteries, and one had four batteries—a total of 111 batteries.

Of the 79 gin installations for which data on the number of stands and number of saws is available, 30 of the 51 single battery gin installations and 16 of the 26 two-battery gin installations have five-stand batteries, and 15 and three, respectively, have four-stand batteries. Nine of the 17 batteries with four stands or less were in the group of gins that ginned under 5,000 bales of cotton in 1969-70. Thus, most of the batteries in the high volume groupings had five stands.

For convenience, it is assumed that half of the total quantity of cotton ginned in a two-battery installation was ginned on each battery and that one-third of the total output of a three-battery installation was ginned on each battery, etc. On this basis, 68 of the 111 batteries in Paraná turned out between 5,000 and 10,000 bales in the 1969-70 season. Twenty batteries ginned under 5,000 bales, 17 ginned between 10,000 and 15,000 bales; five, from 15,000 to 20,000 bales, and one, exceeded 20,000 bales.

Of the 110 batteries in the 79 gins for which the number of stands and number of saws is indicated, there are 519 stands and 43,838 saws. Of the 481 stands for which the number of saws is known with reasonable accuracy, 286 are presumed to be 80-saw stands and 195 are presumed to be 90-saw stands. Thirty-five of the batteries had 5 stands of 90 saws each. This size was followed, in number, by 25 batteries with four stands of 80 saws and 24 batteries of five stands of 80 saws. These three combinations account for three-fourths of the batteries and three-fourths of the total number of saws.

In South Brazil, cotton moves to southern mills and to the Ports of Santos or Paranaguá by rail and truck. During the 1970-71 season, the short crop in the Northeast has caused considerable Southern cotton to be shipped to the Northeast. In North Brazil, cotton is transported by truck either to ports or to northern or southern mills. Some Northern cotton proceeds from ports to southern mills by coastal vessel; some goes to foreign countries by ocean freighter. Principal ports for cotton export in North Brazil are Fortaleza in the State of Ceará, Cabedelo in Paraíba, Natal in Rio Grande do Norte, and Recife in Pernambuco.

Some years ago when cotton ginning companies financed many farmers, there was no question where the farmer so financed would sell his cotton. Now that ginning companies have yielded most of the financing to banks the farmer is free to sell as he sees fit. If farmers are satisfied with the prevailing price at the time their cotton is ready for delivery to gins, they accept it. However, if they think prices will rise as the season progresses, they deliver the cotton and agree to fix the price at a later date. In the current season the price on a large part of the southern

Number of gins and quantity of cotton ginned in Paraná, 1969-70

Bales ginned per gin	Number of batteries per gin			
	1	2	3 or more	Total
	<i>Number of gins</i>	<i>Number of gins</i>	<i>Number of gins</i>	<i>Number of gins</i>
Under 5,000	14	--	--	14
5,000-9,999	25	3	--	28
10,000-14,999	9	13	--	22
15,000-19,999	3	5	--	8
20,000 and over	1	5	2	8
Total	52	26	2	80
	<i>Total bales</i>	<i>Total bales</i>	<i>Total bales</i>	<i>Total bales</i>
Under 5,000	26,383	--	--	26,383
5,000-9,999	192,427	21,361	--	213,788
10,000-14,999	110,455	164,168	--	274,623
15,000-19,999	47,737	87,574	--	135,311
20,000 and over	20,251	124,615	¹ 49,392	194,258
Total	397,253	397,718	¹ 49,392	844,363

¹ One three-battery plant, which ginned 25,032 bales, and one four-battery plant, which ginned 24,360 bales.

crop had not been fixed up to the middle of May 1971 even though the bulk of the crop had already been delivered to gins. It is not unusual for payment to be delayed until all cotton is delivered.

Payment to the farmer frequently is made in the form of a rural promissory note due in a few months. This note can be used to pay off a farmer's own production loan or "cashed" at a bank. The ginning company is required to pay off such notes, with interest, to the holding bank by the time they fall due. This system seems to work very well in practice, for it assures adequate financing for the movement of the crop.

The Foreign Agricultural Service has made no study of gin point prices for seed cotton, but some of the literature and various conversations indicate that it is not at all unusual for farmers to sell their seed cotton to somewhat distant gins rather than to the one closest to their farm. On the financial side, the question arises of whether the farmer benefits from a sufficiently high price to justify the higher hauling charge. From a quality standpoint, one wonders whether the mixing of seed cotton from such a large geographical area tends to improve or lower the uniformity of the year's ginnings of the particular gin. The answer to this in any given year presumably would tend to be a function of the uniformity or lack of uniformity in growing and harvesting conditions in the area served.

In this connection, one of the points favoring cotton production is the continuous active market for cotton that is available to cotton producers at all times. Cotton farmers are more favorably situated than are producers of most other crops or other farm products, who can encounter prolonged periods when there is no ready market or seasonal periods when prices are severely depressed.

It is by no means easy to construct a detailed series of price spreads for cotton between the time it is loaded at the farm for hauling to the gin until it is placed aboard ship or received by a domestic mill. No attempt is made to offer a complete set of spreads, nor is any claim made that the following individual items are accurate. At most, they should be thought of as a first step toward constructing a picture of typical spreads.

One key item in viewing the relative competitiveness of cotton from different countries is the charge for ginning. This is true even though most cotton is sold to ginner as seed cotton and then ginned for the firm's own account. For individuals or firms in Brazil who wish to sell their cotton lint and cottonseed separately, there is a posted gin charge, which in 1970 was about \$12.50 per bale. Farmers who then put their 1970-crop cotton lint in public storage paid about 10.5 cents per bale per month plus a monthly insurance charge of 0.16 percent of the value of the cotton.

It is estimated that the ginner would have an interest and insurance charge of about 2 to 3 percent of the value covering the perhaps 45 days he holds the cotton. He would also have a loss of weight of about 2 pounds per bale. Shipping to São Paulo would be about \$1.76 per bale and moving cotton from São Paulo to f.o.b. Santos is estimated to cost a fixed amount of about \$3.52 per bale plus other charges averaging about 5 percent of the f.o.b.

price. Cotton produced in São Paulo is of course exempt from the ICM tax but for Paraná the ICM charge is 7.5 percent of the invoice value if the cotton is exported through Paranagua and 15 percent if exported from a port in some other State.

In São Paulo State, charges for cotton services by the System of Entrepots and General Warehouse (CEAGESP) are as follows:

In the interior:	<i>Cents per bale</i>
Unloading	49.4
Weighing, separation, moving, and formation	34.8
Loading or piling	56.6
Unpiling	39.2
Loosening or packing	21.8
In São Paulo City:	
Unloading, loading, piling	69.7
Loosening or packing	26.1
Weighing or separation	34.8
Unpiling	53.7
Moving or formation	26.1
Samples printing	21.8
Tagging	53.7

Source: Guia de Comercializacao Rural, 1970.

Government official services for any merchandise are charged as follows:

- Issuance and collection of invoices on the market, including taxes and dues: 1/8% ad valorem;
- Issuance of receipts for deposits per note of \$2.42;
- Issuance of warrants per note \$0.81.

FOREIGN TRADE

Raw cotton

Traditionally, cotton has been one of Brazil's leading export crops and a major source of foreign exchange. In 1970, exports of lint cotton accounted for about 6 percent of the total value of exports. Although this figure was a relatively small part of the total, it was exceeded only by coffee and manufactured items taken as a whole. Because exports are a residual after provision is made for sizable consumption needs, the level of cotton exports has varied sharply from year to year. This tendency has been particularly noticeable in the past 2 decades, when consumption has been moving generally higher and production has climbed irregularly upward. In most recent seasons, exports have totaled over 1 million bales annually—a level more than double exports in the 1955-59 period.

For many years, the record export was the 1.6-million-bale level achieved in 1938-39. This was finally topped in 1968-69, when shipments reached 1.8 million bales, and again in 1969-70, when they moved to another peak of 1.9 million. Brazilian cotton competes strongly with U.S. cotton in nearly all foreign markets, and because of improvements in variety, it is now generally considered more competitive with longer lengths than it was several years ago. For example, Type 5 is frequently compared with U.S. Middling Light Spotted, 1-1/16 inches, in foreign markets.

For many years, Brazilian policy has been aimed toward insuring adequate supplies of domestic cotton for the nation's textile industry. This policy was implemented by granting authority to export cotton only after domestic requirements had been assured. However, in 1966 cotton exports were freed of-quota restrictions.

Brazil's cotton exports, by country of destination

Country of destination	Year beginning August 1							
	Average			1965	1966	1967	1968	1969
	1950-54	1955-59	1960-64					
	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹	1,000 bales ¹
Argentina	1	(²)	1	1	1	(²)	50	0
Belgium & Luxembourg.	14	11	54	60	45	48	107	120
Bulgaria	0	0	1	29	10	62	3	(²)
Canada	4	(²)	(²)	0	(²)	5	7	14
China, Mainland ³	13	6	1	0	0	0	0	2
Czechoslovakia	5	6	2	34	10	0	0	0
France.	70	27	74	40	72	52	136	121
Germany, East ⁴	0	0	0	6	4	43	22	9
Germany, West	106	56	201	179	227	197	359	289
Hong Kong	26	23	86	92	83	34	97	179
Hungary	3	7	8	29	26	16	(²)	0
Italy	43	15	17	19	26	25	120	118
Japan	130	127	127	105	126	74	297	423
Netherlands	26	13	101	82	132	106	126	115
Philippines	(²)	0	5	1	1	0	1	2
Poland	6	21	6	1	24	0	1	0
Portugal	11	1	1	0	3	9	20	11
Romania	0	0	5	0	0	9	9	0
South Africa, Republic of	1	2	26	46	85	39	87	73
Spain	44	21	24	42	3	19	79	32
Sweden	13	7	6	3	0	0	2	14
Switzerland	2	(²)	5	6	5	6	8	5
Taiwan	(²)	0	8	13	10	9	58	185
Thailand	0	0	4	5	11	6	6	69
United Kingdom	150	43	81	52	33	38	81	59
United States.	1	1	3	(²)	0	1	(²)	0
Uruguay	9	9	2	1	6	4	9	12
USSR	0	0	85	70	45	3	37	3
Yugoslavia	9	9	5	3	4	1	7	2
Other countries	38	14	11	18	22	30	36	76
Total	725	419	950	937	1,014	836	1,765	1,933

¹ Bales of 480 pounds net.² Less than 500 bales.³ Includes Taiwan (Formosa) prior to Jan. 1, 1953.⁴ Included West Germany prior to 1952.

Cotton imports normally are made prohibitive by high import duties. However, during the 1970-71 season, the severe reduction in the northeastern crop led officials to authorize the importation of about 23,000 bales of longer staple cotton at reduced duties. A large share of this cotton probably will be obtained from other members of the Latin American Free Trade Association (LAFTA), but the Brazilian Government has temporarily lowered the normal import duty for cotton from non-LAFTA members from 50 percent to 15 percent, and some U.S. cotton has been imported. Brazilian mills are therefore helped in obtaining needed supplies of long-staple cotton that is not available in the greatly reduced northeastern crop in this particular season.

Textiles

Expansion of the cotton textile industry has enabled Brazil to become largely self-sufficient in cotton textile requirements. However, a better balance of cotton goods might well be desired by consumers. Although imports are negligible, exports of cotton textiles have increased irregularly in recent years.

There seems to be no traditional flow of textile shipments to particular countries. In the late 1950's Western Europe took most of Brazil's textile export offerings. Later, other members of LAFTA were major recipients.

More recently, shipments to Western Europe have resumed, and sizable quantities have moved to the United States. In 1969, Brazil exported \$10 million worth of fabrics of natural and manmade fibers, of which 20 percent

moved to the United States. Yarn exports had a value of \$5 million, and the U.S. share was 59 percent. Brazil also exported at least \$4 million of other textiles—rugs, carpets, sheets, tablecloths, towels, lace, etc.—of which 69 percent went to the United States. In the first quarter of 1970 textile exports were valued at \$7.8 million, with over 90 percent of this going to the United States.

THE TEXTILE INDUSTRY

The domestic textile industry is one of Brazil's most important in terms of its contribution to national income. This single industry provides employment for about one-fourth of the workers in the nation's manufacturing sector.

Brazil's textile industry was established more than a century ago. Except for a few relatively short periods, growth has continued for several decades; and, for most of its existence, the industry has been the dominant one in South America. At present, the cotton section of Brazil's textile industry is substantially larger than the cotton textile industries in all other South American nations combined.

A comprehensive study of the Brazilian textile industry published by the United Nations in 1963 verified the widely held impression that much of the industry's equipment needed to be replaced if the textile industry was to meet high standards of technical efficiency. In recent years, modernization programs have been implemented in many Brazilian textile organizations. Some of the nation's mills are now considered quite modern in every respect; however, a substantial part of the industry has still shown little improvement.

On December 31, 1967, Brazil had 3.6 million spindles and 90,000 looms operable for cotton use. Both cotton spindle and loom numbers, as indicated in the following tabulation, are under the 1960 level, with the decline reflecting the replacement of old machines with more efficient ones.

In place Dec. 31	Spindles <i>Thousands</i>	Looms <i>Thousands</i>
1955.....	3,361	110
1956.....	3,391	112
1957.....	3,453	116
1958.....	3,474	119
1959.....	3,700	127
1960.....	3,840	103
1961.....	3,880	103
1962.....	3,700	107
1963.....	3,935	110
1964.....	3,900	97
1965.....	3,600	93
1966.....	3,450	90
1967.....	3,577	90

Brazil's cotton textile industry is concentrated in and around the nation's large cities. The State of São Paulo accounts for over one-third of total capacity. Other important textile States in the South are Guanabara, Minas Gerais, and Santa Catarina. Aggregate capacity in the Northeast is estimated at about 15 percent of the nation's total. With a few exceptions, improvement in the efficiency of cotton textile mills has moved ahead faster in the South than in the Northeast.

Inasmuch as Brazil produces a rather wide range of staple lengths of cotton, Brazilian mills are more adequately supplied than the textile industries of most other producing countries that normally prohibit imports of cotton. Most mills buy their cotton in the open market in Brazil, but a few of the small northern mills buy locally produced seed cotton and operate their own gins. Quite generally, the mills in South Brazil draw cotton from both producing zones.

The nation has experienced a long-term uptrend in cotton consumption. However, in some recent years, the industry has been plagued with troublesome inventories and a tight credit situation. Annual domestic use has held between 1.1 million bales and 1.4 million since 1958-59. This compares with an annual average of 1.1 million bales in 1955-59 and 0.9 million in 1950-54.

Data are more readily available for the textile industry of the State of São Paulo—than for the other States or the nation as a whole. Consequently, some of the São Paulo data are summarized here even though it is not possible to know whether or not they are typical of conditions in other States.

The number of active spindles in São Paulo has fluctuated rather widely. Twenty-five years ago, there were 1.0 million. Numbers subsequently increased rather steadily, reaching 1.5 million by the end of 1954 and the record 1.6 million at the end of 1962. They then turned downward, falling to 1.3 in 1967—the lowest since 1950—and then recouping slightly to 1.4 million in 1969. Average hours worked per spindle also have fluctuated—between a low of 14.5 hours in 1951 and a high of 19.2 in 1969. This latter figure was up from 19.1 hours in 1968 (also a record) and 17.4 in 1967.

During the period 1964-68, about 66 percent of the cotton consumed by São Paulo mills was produced in that State. The northeastern States accounted for 23 percent of the cotton, and others accounted for an average of 11 percent. The share of the other States had been rising sharply over this period as Paraná production has expanded.

A new factor entered the picture in 1969, when São Paulo exempted exports of all primary agricultural products except coffee from the ICM tax and Paraná cut by half the 15-percent tax on cotton exported through its ports while other States retained the tax.

These changes made it more profitable to offer export customers cotton from São Paulo and Paraná and to offer domestic mills cotton from states where the full ICM tax had to be paid regardless of whether the cotton was consumed domestically or exported. Thus, in 1969, mill consumption in São Paulo consisted of only 41 percent of that State's cotton, while 20 percent came from the Northeast and 39 percent from other States.

The State of Paraná was the source of 33 percent of the cotton consumed in São Paulo in 1969, compared with 14 percent in 1968.

Combed yarn production is far less important than carded yarn—16 percent versus 84 percent. Carded yarn production has accounted for most of the increase in recent years and in 1969, hit a record level of 219 million pounds or 40 percent above the level 15 years earlier. During this period internal combed yarn production increased from 36 million pounds to 41 million, for a gain of 15 percent, and total cotton yarn production increased from 192 million to 260 million pounds, for a gain of 36 percent. The percentage share of total production held by the various yarn counts of carded and combed yarns is as follows:

	Carded	Combed	Total
Under 10.	14.7	1.0	12.5
10 - 19	49.5	6.1	42.6
20 - 29	23.1	15.2	21.8
30 - 39	11.7	24.6	13.8
40 - 49	1.0	34.0	6.3
50 - 59	--	11.4	1.8
60 and over	--	7.7	1.2
Total	100.0	100.0	100.0

The 627,000 bales of cotton consumed in São Paulo in 1969 were distributed by staple length as follows:

	Percent
27 mm. and shorter.	10.0
28/30 mm.	30.7
30/32 mm.	38.2
32/34 mm.	11.6
34/36 mm.	5.1
Longer than 36 mm	4.4
Total	100.0

Cotton consumption in Brazil by States

States	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>	<i>1,000 bales¹</i>
Maranhão	16	17	18	16	14	14	12	9	9	(²)
Ceará	28	38	37	37	37	37	29	31	32	(²)
Rio Grande do Norte	5	3	4	5	4	9	7	4	5	(²)
Paraíba	28	28	28	23	21	23	18	17	18	(²)
Pernambuco	96	110	119	124	115	101	92	101	78	(²)
Alagoas	32	32	46	46	27	23	21	19	21	(²)
Sergipe	32	44	46	46	37	32	28	24	28	(²)
Bahia	18	20	28	23	16	14	13	17	18	(²)
Espírito Santo	0	0	0	0	0	0	2	2	5	(²)
Minas Gerais	193	207	211	211	207	197	188	193	220	220
Rio de Janeiro	103	106	102	107	98	81	86	85	85	101
Guanabara	87	92	108	97	102	119	118	121	124	100
São Paulo	587	607	622	604	597	539	539	526	594	627
Santa Catarina	51	53	55	55	55	50	46	55	63	60
Other States	14	16	16	16	2	2	9	9	2	14
Total	1,290	1,373	1,440	1,410	1,332	1,241	1,208	1,213	1,302	1,292

¹ Bales of 480 pounds.
214,000 bales in 1968.

² State breakdown not available; total of 170,000 bales for the Northeast compares with

Total textile availability per capita for 1967, the latest year for which data are available, was about 9.1 pounds, according to data compiled by the Food and Agriculture Organization of the United Nations. This level is slightly higher than the average of 9.0 pounds during 1950-54, but the cotton portion is now somewhat below the 1950-54 level of 7.4 pounds per capita. This illustrates the inroads that manmade fibers are making in the Brazilian textile market.

Cotton's share of the fiber market held above 80 percent for many years. The share first dropped below this level in 1964, and in 1967, the latest year for which data are available, cotton accounted for 75.5 percent of total fiber use. Both non-cellulosic and cellulosic fibers have gained a growing share of the market at the expense of cotton and wool, and manmade fibers accounted for 20.6 percent of total fiber used in 1967, up from less than 15.0 as recently as 1962.

If the Brazilian textile industry is to play its maximum role in Brazil's economic development, more of the firms producing textiles will need to modernize their mills and become more efficient producers. During 1970 a number of steps were taken to strengthen the Brazilian textile industry. The Industrial Development Council handed down a resolution in May 1970 stating that the Council would approve projects to expand clothmaking factories under condition that there would be a compensatory junking of obsolete equipment. The junking requirement could be set aside provided the new machinery is for the manufacture of a product not otherwise offered by the textile industry, or provided the company intends to export 70 percent of the product.

The Ministry of Finance increased the special tax credit bonus allowed for export of the more important textile categories from the former 12 percent level to 15 percent. The special tax credit bonus is in addition to the exemption from the industrial products tax (IPI) enjoyed by all manufactured exports. The bonus credit may be used as a credit against payment of the ICM tax on domestic sales of manufactures. There is also exemption from the payment of income tax on profits from exports and a drawback provision on imported components destined for the production of merchandise for export. Another aid to textile exports is provision for low-interest credits, which permits 100-percent financing of textile exports.

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